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λ_p , whereby those gain ions at radii greater than said mode field radius are unexcited by pump light and are free to absorb signal light.

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42. (Amended) A fiber amplifier comprising a gain optical fiber having only one single-mode core, said core containing dopant ions capable of producing stimulated emission of light within a predetermined band of wavelengths including a wavelength λ_s when pumped with light of wavelength λ_p , said gain fiber having input and output ends, and wherein the gain spectrum of said gain optical fiber, over said band of wavelengths and when pumped with light from wavelength λ_p , has a first portion which is relatively flat and a second portion which is not flat and exhibits gain greater than the gain exhibited over said relatively flat portion;

filtering means for attenuating light at at least some of the wavelengths within said predetermined band of wavelengths, said filtering means containing ions that can be excited by light of wavelength λ_p , said filtering means having a transmission curve over said predetermined band of wavelengths and in the absence of excitation by said gain fiber over said predetermined band of wavelengths when said gain fiber is excited by light at wavelength λ_p so that when light in the range of said predetermined range of wavelengths is amplified and filtered by said filtering means, the resulting gain spectrum for said amplifier over said predetermined range of wavelengths is substantially flat;

means for introducing a signal of wavelength λ_s into said gain fiber input end;

means introducing pump light of wavelength λ_p into said gain fiber; and

means for preventing the excitation of said filtering means by light of wavelength λ_p .

43. (Amended) A fiber amplifier comprising a gain optical fiber having only one single-mode core, said core containing dopant ions capable of producing stimulated emission of light within a predetermined band of wavelengths including a wavelength λ_s when pumped with light of wavelength λ_p , said gain fiber having input and output ends, said dopant ions being selected from the group consisting of erbium, neodymium and praseodymium, and wherein the gain spectrum of said gain optical fiber, over said band of wavelengths and when pumped with light from wavelength λ_p has a first portion which is relatively flat and a second portion which is not flat and exhibits gain greater than the gain exhibited over said relatively flat portion;

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filtering means for attenuating light at at least some of the wavelengths within said predetermined band of wavelengths, said filtering means containing a dopant selected from the group consisting of erbium, dysprosium, neodymium, ytterbium, samarium, praseodymium, thulium, vanadium and cadmium selenide, said filtering means having a transmission curve over said predetermined band of wavelengths and in the absence of excitation by said gain fiber over said predetermined band of wavelengths when said gain fiber is excited by light at wavelength λ_p so that when light in the range of said predetermined range of wavelengths is amplified and filtered by said filtering means, the resulting gain spectrum for said amplifier over said predetermined range of wavelengths is substantially flat;

means for introducing a signal of wavelength λ_s into said gain fiber input end; and

means introducing pump light of wavelength λ_p into said gain fiber.

44. (Amended) An optical fiber amplifier having a flattened gain spectrum for use over a wavelength range of about 1530 to about 1560nm comprising:

a gain optical fiber having only one core, said core containing ions capable of producing stimulated emission of light within the band of wavelengths extending from about 1530 to about 1560nm when pumped with light having a wavelength capable of causing said stimulated emission in said band of wavelengths, said stimulated emission from said gain fiber exhibiting a gain spectrum including a peak around 1532nm and a substantially flat gain region extending from about 1540nm to about 1560nm, said gain fiber having input and output ends;

a filtering fiber exhibiting an absorption spectrum and having an input end and an output end, one of the input and output ends of said filtering fiber being optically connected to one of the output and input ends, respectively, of said gain fiber, said filtering fiber having a core doped with ions which are capable of absorbing light according to said absorption spectrum within the band of wavelengths extending from about 1530 to about 1560nm, the absorption spectrum of said filtering fiber having a substantially non-flat absorption spectrum in the spectral region from about 1530 to about 1540nm and particularly at about 1532nm and having a relatively flat absorption spectrum in the region from about 1540 to about 1560nm, the absorption spectrum exhibiting a lower absorption in the region from about 1540 to about 1560nm than the absorption in the spectral region from about 1530 to about 1540nm and particularly at about 1532nm, one of the input and output ends of said filtering fiber being adapted for connection to a transmission fiber input end;